

REMARKS

Applicant respectfully requests allowance of the subject application. Claims 1-44 and 55-63 are pending. In view of the following remarks, Applicant respectfully requests that the rejections be withdrawn and the application be forwarded along to issuance

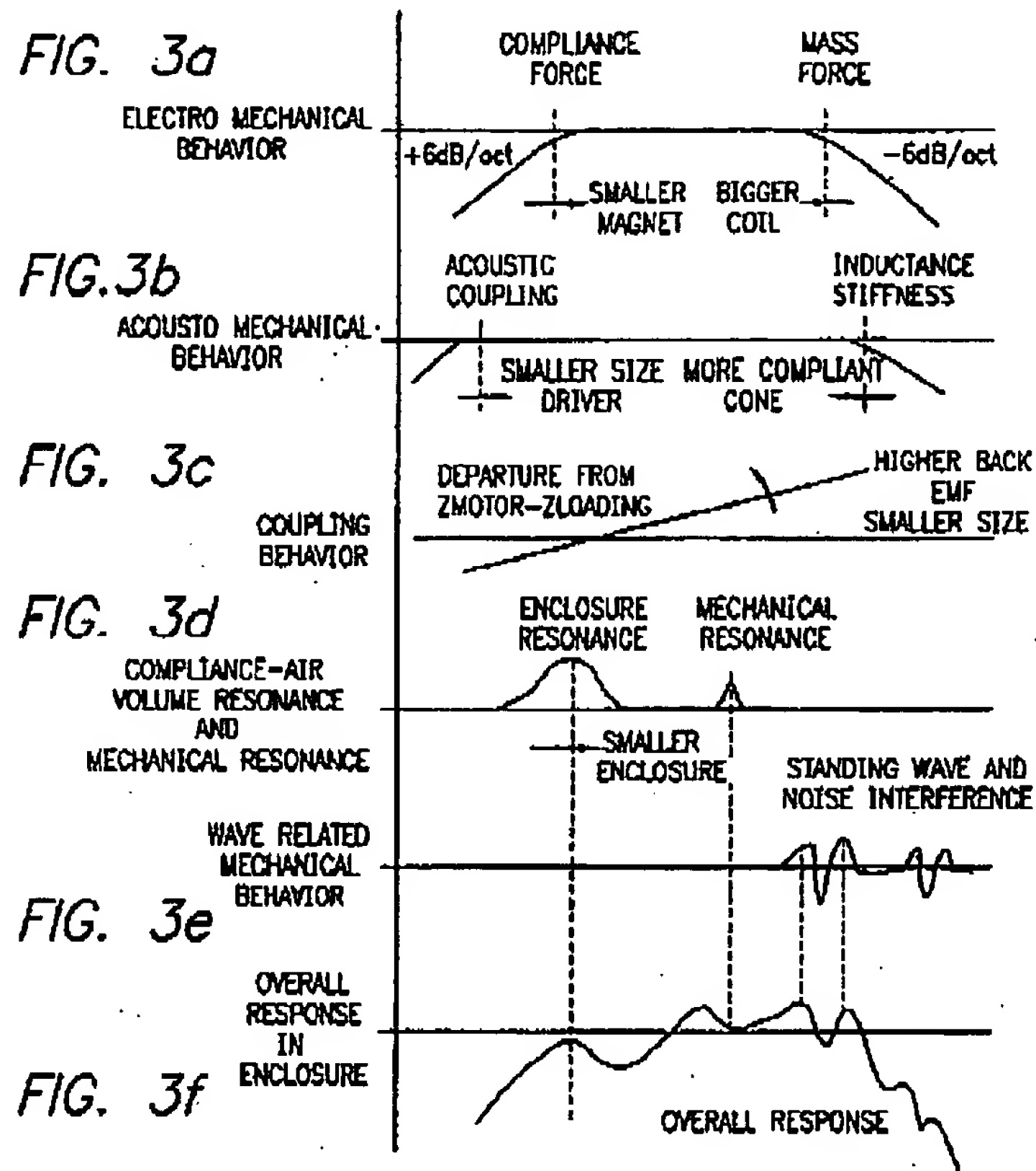
§ 112, First Paragraph Rejection

Claims 13, 37 and 55 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Applicant respectfully disagrees.

Regarding Claims 13 and 37, the Office asserts that the features "another said filter simulating the enclosure" and "another said filter simulates the enclosure" of these claims, respectively, "are not described in the specification in such as way as to reasonable convey to one skill in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention". *See Office Action Dated June 16, 2005, Page 2.* This is not the case.

As previous described, support for this feature may be found throughout the specification and drawings as filed, such as through pages 12-14, e.g., "each of these computed and adjustable compensation responses can be scaled to a parametrically variable, feature, or design aspect, relating to size, a moving property, or acoustic radiation behavior, amongst other things" and "instead of compiling or reducing speaker elements to create a lumped response system, the compensation system uses minimum-phase equivalence and string of non-interacting filters. *See Application, Pages 12 and 13, respectively.*

A plurality of such response components which may be modeled using the non-interacting filters may be found in relation to FIGS. 3a-3e. The response components are combined to form the overall response shown in FIG. 3f. These figures are excerpted as follows for the sake of convenience.



Thus, as shown in the above FIGS. 3a-3f and as described in the specification, "Figures 3a-3e shows a plurality of individual responses related to speaker components which combine to produce the overall response curve". See Application, Page 13, Lines 7-9. As is apparent from the figure, enclosure resonance is one such individual response related to a speaker component (e.g., the enclosure) which is combinable to define an overall response for a sonic

1 reproduction device as recited in Claims 13 and 37. Another such example may
2 be found in relation to FIG. B1. Thus, it is readily apparent when viewing these
3 figures and upon reading the accompanying discussion that the Applicant was in
4 possession of the claimed invention when the Application was filed.

5 Accordingly, since this is the only rejection offered by the Office in respect
6 to Claims 13 and 37, withdrawal of the rejection under § 112, first paragraph is
7 respectfully requested and allowance of Claims 13 and 37, as well as Claims 14-18
8 and 38-44 which depend from these claims respectively, is also respectfully
9 requested.

10 Claim 55 was also rejected as failing to comply with the written description
11 requirement. In particular, the Office asserts that "at least one said filter, which
12 corresponds to an individual component of the sonic reproduction device, is
13 replaceable with another filter in response to replacement of the individual
14 component of the sonic reproduction device with another individual component,
15 wherein the other filter simulates a behavioral characteristic of the other individual
16 component" is not supported by the specification or drawings. *See Office Action*
17 *Dated June 16, 2005, Page 3.* The Applicant respectfully disagrees.

18 Beginning at page 1 of the subject Application, the Applicant describes
19 characteristics of traditional functional or behavioral models of loudspeakers used
20 to develop compensations. Most often, the transformed electromechanical,
21 acoustic, and mechanical representations expressed in the model are further
22 simplified or reduced to fewer elements. Consequently, traditional models are
23 neither intended, nor capable of making parametrically addressed zero-phase
24 compensations when speaker parts are changed. *See Application, Pages 2-3.*
25

1 In the present Application, however, the behavioral characteristics may be
 2 defined by individual or groups of individual components of the sonic
 3 reproduction device. *See Application, Page 8.* Instead of compiling or reducing
 4 speaker elements to create a lumped response system, the compensation system
 5 uses minimum-phase equivalence and strings of non-interacting filters. *See*
 6 *Application, Page 13.* By modeling the production device's individual
 7 components and the characteristics of those components or groups of components,
 8 individual compensations for these characteristics can be created and manipulated
 9 parametrically. *See Application, Page 8.* Therefore, these same compensations
 10 can be applied to additional systems having similar components or characteristics.
 11 *Id.* Thus, the present Application provides support for a compensation system that
 12 addresses the changing of speaker parts through strings of non-interacting filters,
 13 such that, a filter may be changed when its respective component is changed.

14 Accordingly, since this is the only rejection offered by the Office in respect
 15 to Claim 55, withdrawal of the rejection under § 112, first paragraph is
 16 respectfully requested and allowance of Claim 55, as well as Claims 56-63 which
 17 depend from this claim is also respectfully requested.

18 19 **§§ 102(b) and 103 Rejections**

20 Claims 1-3, 5, 6, 29, 30 and 32 stand rejected under 35 U.S.C. § 102(b) as
 21 being anticipated by U.S. Patent No. 5,815,585 to Klippel (hereinafter "Klippel").
 22 Claims 4, 7, 8, 17, 31 and 33 stand rejected under 35 U.S.C. § 103(a) as being
 23 unpatentable over Klippel. Claims 9, 10 and 34 stand rejected under 35 U.S.C. §
 24 103(a) as being unpatentable over Klippel in view of U.S. Patent No. 4,223,181 to
 25 Simeau (hereinafter "Simeau"). Claims 11, 12, 35 and 36 stand rejected under 35

1 U.S.C. § 103(a) as being unpatentable over Klippel in view of U.S. Patent No.
2 6,295,364 to Finn et al. (hereinafter "Finn").

3
4 **The References**

5 **Klippel** describes a detector circuit which derives a motional signal of a
6 transducer (displacement, velocity, acceleration) by sensing terminal voltage and
7 input current of the transducer only. The motional signal is used for adjusting an
8 adaptive correction filter to compensate for the distortions of the transducer and to
9 produce a desired transfer characteristic of the overall system. *See Klippel, Col. 3,*
10 *Lines 38-44.* The main purpose of the invention of Klippel is to omit an additional
11 acoustic or mechanic sensor which is expensive and affects the efficiency of the
12 distortion reduction. *See Klippel, Col. 3, Lines 45-50.*

13 This purpose is purportedly reached in Klippel by connecting a detector
14 circuit between the output of the correction filter and the terminals of the
15 transducer. *See Klippel, Col. 3, Line 60 to Col. 4, Line 2.* The detector circuit
16 produces a motional signal (e.g. velocity) of the voice coil by modeling the
17 electric input circuit of the transducer. The detector circuit is adaptive and
18 determines the unknown model parameter (resistance and inductance of the voice
19 coil, force factor B1) from the sensed motional signal on-line. A nonlinear
20 subsystem compensates for the effect of the displacement varying force factor.
21 The structure of the circuits and their connection is directly derived from a lumped
22 parameter model of the electrodynamic transducer. *See Klippel, Col. 5, Lines 10-*
23 *13.*

24 **Simeau** describes a signal processing device for audio frequency noise
25 reduction. *See Simeau, Col. 1, Lines 9-10.* The signal processing device has an

1 error channel which carries complimentary spectra signals, and a main channel
 2 which carries the other complimentary spectra signal. The transmission
 3 characteristics of the main channel are controlled by the signal carried by the error
 4 channel which controls the transition frequency. *See Simeau, Col. 2, Lines 39-45.*

5 **Finn** describes a simplified communication system that has first and second
 6 acoustic zones, and respective microphones and loudspeakers. First and second
 7 noise sensitive bandpass filters and first and second equalization filters are
 8 provided in the first and second channels, respectively. Each equalization filter
 9 reduces resonance peaks in the acoustic transfer function between the receiving
 10 loudspeaker in the other zone and the sending microphone in the one zone to
 11 reduce feedback by damping resonance peaks.

12 **The Claims**

13 **Claim 1** recites an apparatus for modifying an electrical audio signal for
 14 input to a sonic reproduction device that includes a speaker characterized by a
 15 plurality of individual responses which in combination define an overall response
 16 for the sonic reproduction device which includes frequency, time, phase and
 17 transient response, said apparatus comprising:

- 18 • a plurality of modification filters having modification responses that
 19 simulate the plurality of individual responses, at least one said modification
 20 filter simulating an individual component of the speaker, the modification
 21 filters for receiving the electrical audio signal, modifying the electrical
 22 audio signal and providing the electrical audio signal to the sonic
 23 reproduction device; and
- 24 • a plurality of adjustable parameters, each associated with at least one of the
 25 modification filters for allowing adjustments to the responses of the
 modification filters;

- wherein the adjustments create a plurality of individual conjugate responses, each individual conjugate response associated with at least one of the plurality of individual responses.

Neither Klippel, nor any of the other submitted references, alone or in combination, disclose, teach, nor suggest "a plurality of individual responses which in combination define an overall response for the sonic reproduction device which includes frequency, time, phase and transient response" as claimed in claim 1.

The Office asserts the following portion of Klippel at FIG. 2, filters 19-23 and Col. 5, lines 5-19 as disclosing a "motional signal which will inherently have a mechanical frequency, times, phase and transient response". *See Office Action Dated June 16, 2005, Page 3.*

The circuits 19-23 and the summers 24-27 are used to estimate the motional signal $v(t)$ from both electric signals $i(t)$ and $u_L(t)$. Every circuit 19-23 has one signal input 33-37, one signal output 43-47 and one additional input 38-42 for the error signal. Every summer 24-27 has two signal inputs and one signal output. The structure of the circuits 19-23 and their connection is directly derived from the lumped parameter model of the electrodynamic transducer. The electric input circuit in the lumped parameter model comprises the series connection of the resistance R_e , the inductance L_e of the voice coil and the electrodynamic transformer. The electrodynamic transformer is defined by the force factor $B_L(X)$ which depends on the displacement $x(t)$ of the voice coil and couples the back-induced voltage $u(t)$ with the velocity $v(t)$ of the voice coil by the relationship $u(t) = B_L(x)v(t)$ (2). *Klippel, Col. 5, Lines 5-20.*

It is respectfully submitted that the above excerpted portion merely described a lumped-parameter model and does not disclose "plurality of individual responses which in combination define an overall response for the sonic reproduction device

1 which includes frequency, time, phase and transient response" as recited in
2 Claim 1. Indeed, Klippel does not even include the words "phase" or "transient
3 response". Accordingly, for at least these reasons, this claim is allowable and
4 withdrawal of the rejection is respectfully requested.

5 Claims 2-12 depend either directly or indirectly from claim 1 and are
6 allowable as depending from an allowable base claim. These claims are also
7 allowable for their own recited features which, in combination with those recited
8 in claim 1, are neither shown nor suggested in the references of record, either
9 singly or in combination with one another.

10 Claim 29 recites a sound system comprising:

- 11 • a sonic reproduction device having associated mechanical, acoustic and
12 electromagnetic behavioral characteristics;
- 13 • a source for outputting an electrical audio signal to a model of the sonic
14 reproduction device, the model having a plurality of filters that simulate at
15 least one of the mechanical, acoustic and electromagnetic behavioral
16 characteristics of the sonic reproduction device, at least one said filter
17 simulating an individual component of a speaker of the sonic reproduction
18 device, the plurality of filters providing an overall response of the sonic
19 reproduction device that includes frequency, time, phase and transient
20 response, the model outputting the electrical audio signal to the sonic
21 reproduction device; and
- 22 • a controller that modifies the responses of the filters to transform the model
23 into a conjugate model having a plurality of filters with responses that
24 comprise conjugates to the original response of the filter.

19 Klippel does not disclose these aspects.

20 For example, Klippel does not disclose a "plurality of filters providing an
21 overall response of the sonic reproduction device that includes frequency, time,
22 phase and transient response" as claimed in claim 29. The Office in this instance
23 (as opposed to Claim 1) asserts a different section of Klippel for this feature,
24 which is excerpted as follows:
25

1 Every parameter n_0 , r , l , n_1 , n_2 in Eqs. (10) and (11)
2 corresponds with one of the adaptive circuits 19-23. Circuit
3 19 corresponds with the first term on the right side of Eq. (11)
4 and multiplies the terminal voltage $u_L(t)$, supplied from
5 output 32 via input 33 by parameter n_0 . The circuit 20
6 corresponds with the effect of the voice coil resistance in the
7 second term in Eq. (11) and multiplies the input current $i(t)$
8 supplied from output 31 via input 34 by parameter r . The
9 circuit 21 corresponds with the inductance of the voice coil
according to the third term in Eq. (11). The current signal $i(t)$
supplied via input 35 from output 31 is first differentiated and
then multiplied by parameter l . The signals at the outputs 43,
44, 45 of the circuits 19, 20, 21 are summed up to the signal
 $w(t)$ by summers 24 and 25.

10 However, this section does not disclose "frequency, time, phase and transient
11 response" as recited in Claim 29. Indeed, nowhere in the entire text of Klippel is
12 "phase" or "transient response" even mentioned. Accordingly, for at least these
13 reasons, Claim 29 is allowable and withdrawal of the rejection is respectfully
14 requested.

15 **Claims 30-36** depend either directly or indirectly from claim 29 and are
16 allowable as depending from an allowable base claim. These claims are also
17 allowable for their own recited features which, in combination with those recited
18 in claim 29, are neither shown nor suggested in the references of record, either
19 singly or in combination with one another.

20 For example, **Claim 33**, as well as **Claims 7 and 8**, are rejected as being
21 obvious over Klippel. The Office correctly asserted that Klippel "does not
22 explicitly disclose cut-off filters". *See Office Action Dated June 16, 2005, Page 6.*
23 However, the Office then incorrectly asserts that "the filters will have a cut-off
24 frequency at some values in order to modify the audio signal" as well is "It is well
25 known in the art the center frequency of a filter is related to the Q factor by

1 $Q=f_0/BW$ where f_0 is the center frequency and BW is the bandwidth". *See Office*
2 *Action Dated June 16, 2005, Page 6.* This is not the case.

3 Beginning at page 22 of the subject application, an exemplary cutoff filters
4 are described. For example Sallen and Key circuits can make active high-pass and
5 low-pass filters with adjustable peaking responses. Figure 9 shows the two filters
6 configured to a single op amp. Mid-band response is flat and cutoff slopes are +
7 and - 18dB per octave. Peaking amplitude of L_p and H_p are adjustable and
8 correspond to FIG. 4b. *See Application, Page 22 and FIGS. 4B and 9.* Klippel,
9 therefore, does not teach or suggest a cut-off filter.

10 Accordingly, for at least these reasons, Claims 7, 8 and 33 are allowable
11 and withdrawal of the rejection is respectfully requested.

1 **Conclusion**

2 All of the claims are in condition for allowance. Accordingly, Applicant
3 requests a Notice of Allowability be issued forthwith. If the Office's next
4 anticipated action is to be anything other than issuance of a Notice of Allowability,
5 Applicant respectfully requests a telephone call for the purpose of scheduling an
6 interview.

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8 Respectfully Submitted,

9
10 Dated: July 27th, 2005

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